

Abstract

Pump chambers are disclosed that include at least one spacer element therein to prevent any gas in the pump chamber from being pumped from the pump chamber during pumping. In some embodiments, the pump chambers are included in removable pumping
5 cartridges that are constructed and configured for coupling with reusable pump drives. Some embodiments of pump chambers including spacer elements therein comprise a substantially rigid component forming a wall of the pump chamber with a flexible or movable membrane disposed on the wall to form the chamber. Spacer elements in such pump chambers are, in some embodiments, attached to a wall of the substantially rigid component so as to prevent
10 the movable/flexible membrane from contacting the wall during pumping.

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